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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,635	02/19/2002	Hang Jin	28999.50	5309

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EXAMINER

JACKSON, BLANE J

ART UNIT PAPER NUMBER

2685

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/078,635

Applicant(s)

JIN ET AL.

Examiner

Blane J Jackson

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 17, 21, 23, 26-29, 37 is/are rejected.
- 7) ☒ Claim(s) 3, 5-16, 18-20, 22, 24, 25, 30-36 and 38-49 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 17, 21, 23, 27-29, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beasley (U.S. Patent 5,377,255) with a view to Rickard (U.S. Patent 5,726,980).

As to claims 1 and 26, Beasley teaches a wireless enhancer and method for enhancing a wireless radio signal between a wireless terminal and a base transceiver station (BTS) comprising:

A first antenna for receiving an incoming signal (figure 9, antenna (62B),

A receiver/ transmitter sub-system that amplifies the incoming signal from the first antenna (figure 9, only amplifier (18), where it is directionally switched to receive/ transmit to the first and second antennas),

A demodulator coupled to the system for demodulating the signal and detecting timing information (reference does not include frequency conversion but timing control (26A) for control of this time division duplex communication repeater, column 7, lines 12-26),

A second antenna for further transmitting the amplified signal from the transmitted sub-system (figure 9, antenna (22) for local coverage zone of mobile telephones),

A switch matrix that controls connection switching among the first antenna, the second antenna, the transmitter sub-system and the receiver sub-system (transfer switch (16) to select the transmission direction in accordance with the timing control (26a) and description of the transfer switch operation: column 4, lines 25-46),

Wherein the connection switching of the switch matrix is made based on the timing information detected by the demodulator and based on whether the incoming signal comes from a terminal or a base transceiver station (BTS) of a wireless communication network (Time Division Duplex (TDD) wireless telephone system with repeaters, column 2, line 56 to column 3, line 8).

Beasley teaches an amplifier to receive/ transmit the signal towards the antenna selected by a controlled switch but does not teach a receiver sub-system that amplifies and converts the incoming signal from the first antenna to a first predetermined frequency band and a transmitter sub-system operable with the receiver sub-system that converts the signal from the receiver sub-system to a second predetermined frequency band and amplifies the signal.

Rickard also teaches a time division duplex communications repeater (wire line rather than wireless) but with a receiver sub-system that amplifies and converts the incoming signal from the first input to a first predetermined frequency band and a transmitter sub-system operable with the receiver sub-system that converts the signal

from the receiver sub-system to a second predetermined frequency band and amplifies the signal (figure 5, column 3, line 38 to column 4, line 16). Rickard also teaches a demodulator coupled to the receiver sub-system for demodulating the converted signal and detecting timing information (demodulator (62) to detect timing to control a switching function, to switch the local oscillators to respective receiver/ transmitter circuits, column 4, lines 11-16).

Since Beasley teaches wireless and wire line embodiments of a wide band TDD repeater where Rickard teaches only a wire line TDD repeater but with receive/ transmit frequency control, it would have been obvious to one of ordinary skill in the art at the time of the invention to upgrade the simple amplifier circuit of Beasley with the frequency conversion circuits of Rickard to enhance timing determination, selective channel operation and increased isolation of the input/ output ports of a time division duplex repeater.

As to claim 2, Beasley teaches the first antenna further comprises a directional antenna pointing to at least one component of the receiver sub-system (figure 9, directional antenna (62B)).

As to claim 4, Beasley teaches the second antenna further comprises an omni-directional antenna (figure 9, antenna (22) for local coverage zone).

As to claim 17, Beasley teaches the demodulator is operable with a digital base band module to generate switch timing information (column 7, lines 21-26).

As to claim 21, Rickard of Beasley modified teaches two local oscillators capable of each running at two frequencies selected by the clock or timing signal for the transmitter sub-system and receiver sub-system for their signal conversions (figure 6, column 4, lines 17-24) but does not teach a synthesizer to generate frequencies for signal conversions. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to identify the local oscillators of Rickard as an alternative multi output frequency synthesizer to support the single or two stage up and down conversion of the repeated signal.

As to claim 23, Beasley teaches the switch matrix is further enhance by at least one low noise amplifier connected between the first and second antennas for reducing signal coupling therebetween (figure 9, amplifier (18), switch (16), antennas (62b) and (22)).

As to claim 27, Beasley teaches the first antenna is for receiving signals from the BTS and transmitting signals to the terminal and the second antenna is for receiving signals from the terminal and transmitting signals to the BTS (figure 9, base station 1A) linked to first antenna (62A) and second antenna (22) linked to terminals in local coverage zone).

As to claim 28, Beasley teaches generating a switch control signal based on the signal received and processed and the detected timing information (timing control (26A), column 7, lines 12-23 and the processing by the receiver sub-system is part of claim 1, Rickard reference).

As to claim 29 with respect to claim 28, Beasley modified teaches generating the control signal further comprises:

Synchronizing to the incoming signal received at the receiver sub-system to align a demodulation timing thereof,

Demodulating the signal from the receiver sub-system,

Determining a ratio of reverse link and forward link communication from the demodulated signal,

Generating a switching timing signal that properly indicates switching needs between an reverse link and forward link communications based on a Time Division Duplex technology (Beasley (and Rickard) teaches a TDD technology repeater: column 2, line 56 to column 3, line 8, column 7, lines 21-26, Rickard is clear on synchronizing to the incoming signal; column 3, lines 38-55).

As to claim 37, Beasley teaches a wireless time division duplex (TDD) enhancer comprising:

A directional donor antenna that communicates with a base transceiver station (BTS) (figure 9, directional antenna (62B)),

A service antenna that communicates with a plurality of terminals (figure 9, omni antenna (22) to local coverage zone),

A receiver sub-system and a transmitter subsystem that comprises a low noise amplifier (amplifier (18)),

A demodulator coupled to the system that determines reverse link and forward link time slots based on a forward link signal sent from the base transceiver station (column 7, lines 12-26),

A switch matrix selectively coupling the donor antenna, the service antenna the transmitter sub-system and the receiver sub-system (figure 9, four port transfer switch (16), operation described for figure 2: column 4, lines 30-46),

Wherein during the forward link time slots, the switch matrix connects the donor antenna to the receiver sub-system to receive incoming signals and connects the service antenna to the transmitter sub-system to transmit outgoing signals at the carrier frequency and wherein during the reverse link time slot, the switch matrix connects the service antenna to the receiver sub system and the donor antenna to the transmitter sub system for receiving incoming at the second frequency and transmitting outgoing signals at the first frequency respectively (column 2, line 56 to column 3, line 8).

Beasley teaches an amplifier to receive/ transmit the signal towards the antenna selected by a controlled switch but does not teach a receiver sub-system comprises a low noise amplifier, a down converter and an intermediate frequency filter an

intermediate frequency amplifier from the first antenna to a first carrier frequency and a transmitter sub-system coupled to the output of the receiver sub-system comprising an up converter and power amplifier that converts the signal from the receiver sub-system to a second carrier frequency or a synthesizer that generates at least two local frequencies for use by the receiver sub-system and the transmitter sub-system.

Rickard also teaches a time division duplex communications repeater (wire line rather than wireless) with a receiver sub system for signal conversion, filtering and amplification of the incoming signal from the first input to a first carrier frequency and a transmitter sub-system operable with the receiver sub-system with signal filtration, frequency conversion and amplification that converts the signal from the receiver sub-system to a second carrier frequency band (figure 5, column 3, line 38 to column 4, line 16). Rickard also teaches a demodulator coupled to the output of the receiver sub-system for that determines reverse link and forward link time slots based on a forward link signal (demodulator (62) to detect timing to control a switching function, to switch the local oscillators to respective receiver/ transmitter circuits, column 4, lines 11-16).

Since Beasley teaches wireless and cable embodiments of a wide band TDD repeater where Rickard teaches only a cable based TDD repeater but with receive/transmit frequency control, it would have been obvious to one of ordinary skill in the art at the time of the invention to upgrade the simple amplifier circuit of Beasley with the frequency conversion circuits of Rickard to enhance timing determination, selective channel operation and increased isolation of the input/ output ports of a time division duplex repeater.

Rickard of Beasley modified teaches a system to generate at least two local frequencies for use by the receiver sub-system and the transmitter sub-system (column 4, lines 9-24) but does not specifically teach a synthesizer to generate at least two local frequencies. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to identify the local oscillators of Rickard as an alternative multi output frequency synthesizer to support the single or two stage down and up conversion of the repeated signal.

Beasley teaches a demodulator to determine timing signals based on a forward link signal sent from the base transceiver station (column 7, lines 12-20) but does not teach a demodulator to determine timing signals coupled to the output of the receiver sub-system. Rickard teaches a clock extraction device or demodulator that is a standard CT2 terminal or other type receiver coupled to the output of the receiver sub-system to determine reverse link and forward link time slots based on a signal from the head end (column 3, line 56 to column 4, line 35). It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the modification of Beasley the clock extraction circuits of Rickard to provide an alternative type continuous source of switching signals.

Allowable Subject Matter

2. Claims 3, 5-16, 18-20, 22, 24, 25, 30-36 and 38-49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

Conclusion


3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kok et al. (U.S. Patent 5,060,293) discloses an antenna switch for switching a receive port and a transmit port between two antennas. Beasley (U.S. Patent 5,634,191) discloses a repeater with wireless TDD embodiment. Itaya (U.S. Patent 5,903,592) discloses a repeater with plural receiving/ transmitting frequency conversion channels. Weaver, Jr. et al. (U.S. Patent 6,108,364) discloses a time division duplex repeater for use in a CDMA system.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J Jackson whose telephone number is (703) 305-5291. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ


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